GRAND CALUMET RIVER RESTORATION FUND COUNCIL

Restoration Alternatives Development and Evaluation

West Branch Characterization

Grand Calumet River

Proposed Sampling

River Reach	Number of Transects	Number of Cores	Total Number Samples	Number Samples Analyzed
Indianapolis Blvd. To White Oak	4	12	60	24
White Oak to Columbia Ave.	4	12	60	24
Columbia Ave to Calumet Ave.	3	9	45	18
Calumet Ave. to Sohl Road	2	6	30	12
Sohl Road to Hohman Ave.	2	6	30	12
Hohman Ave. to Railroad Bridge	--	--	--	--
Railroad Bridge to State Line	2	6	30	12
TOTAL	17	51	255	102


Jim Smith 10/14/02
Core WB-11


Jim Smith 10/14/02
Core WB-07

Jim Smith, 10/17/02

WB-44

Jim Smith 10/22/02

WB-29

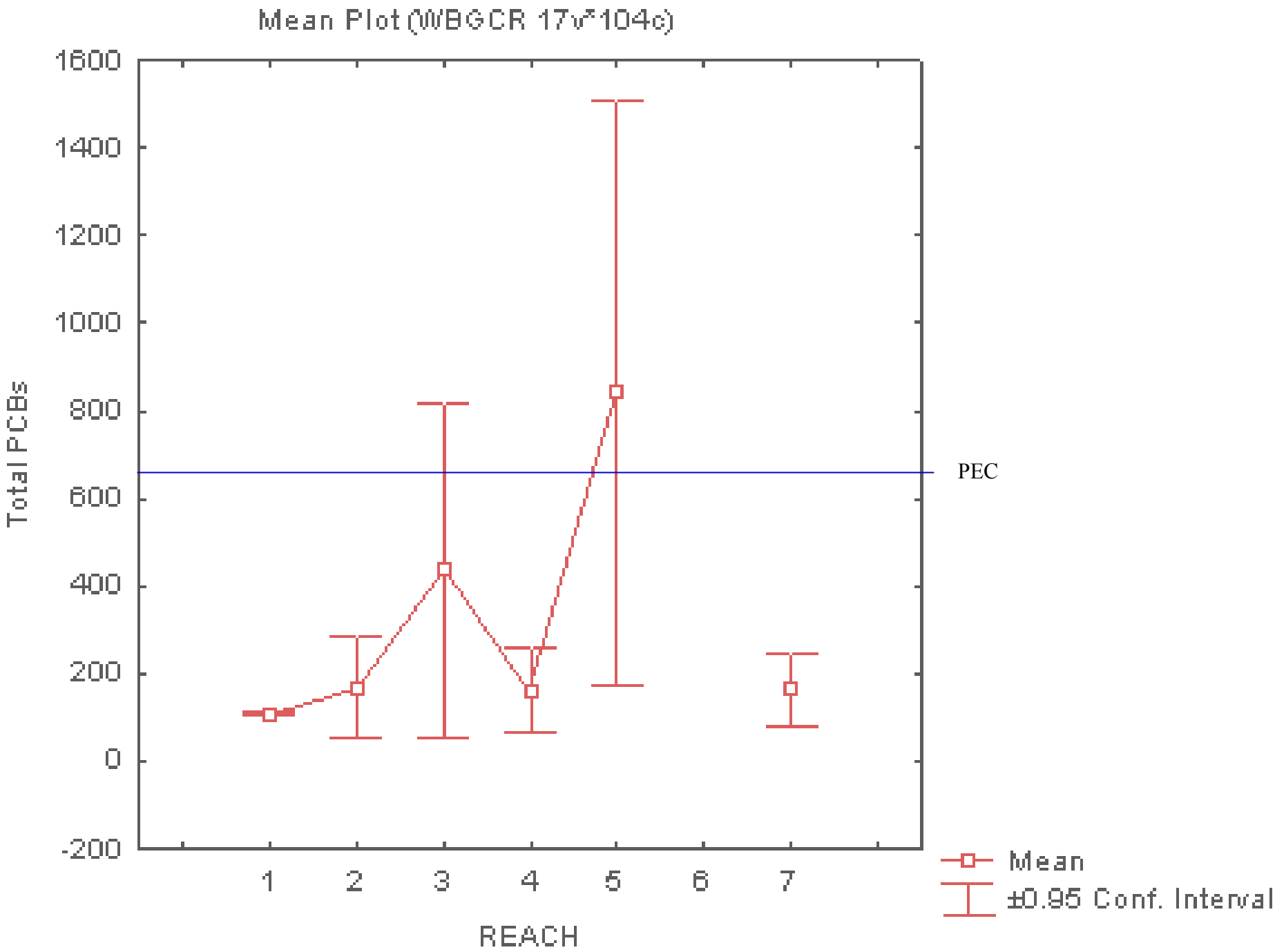
Jim Smith, 10/22/02 WB-
DNAPL Soaked Zone

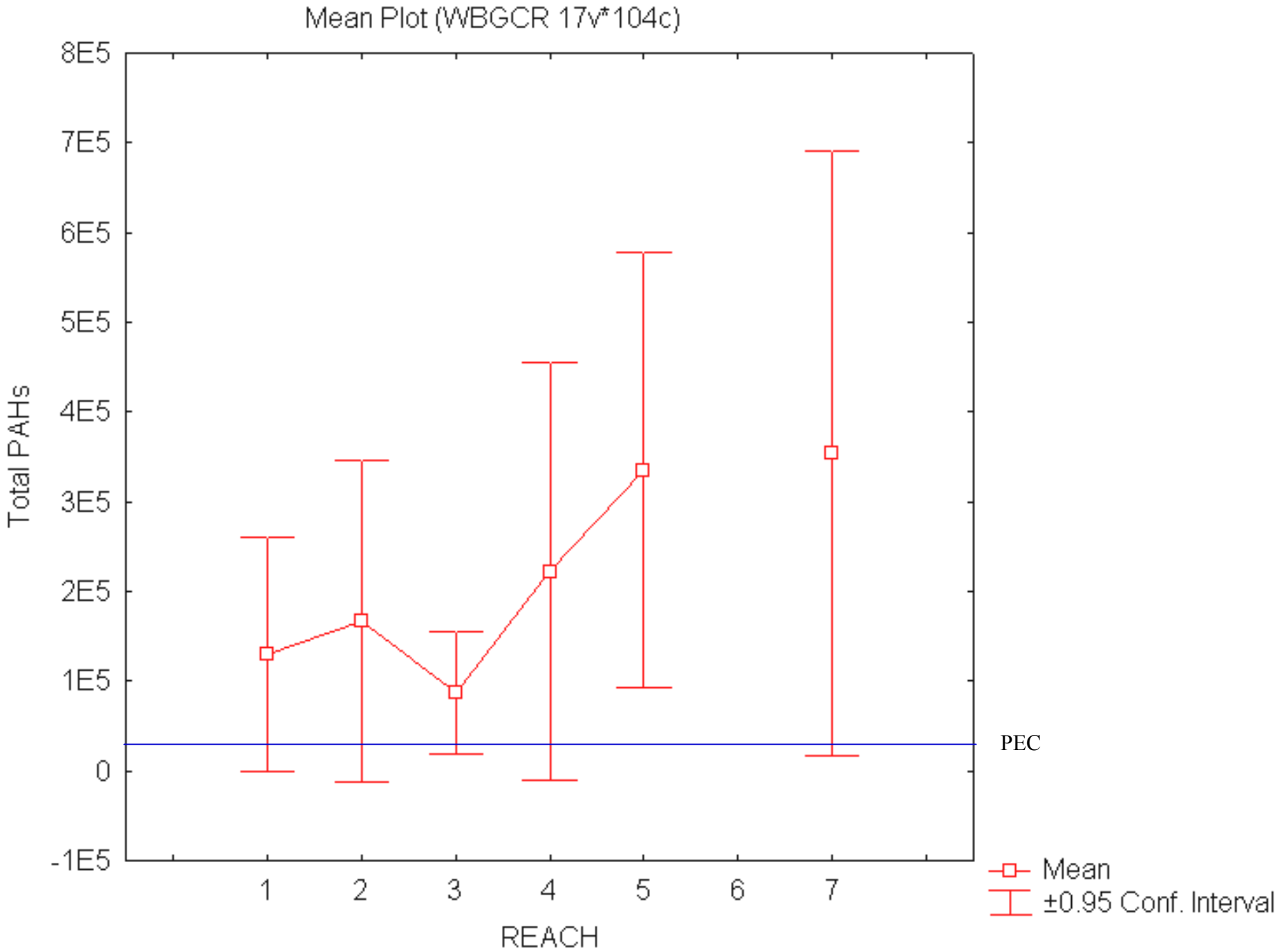

Jim Smith 10/30/02
Reach 2 - West End

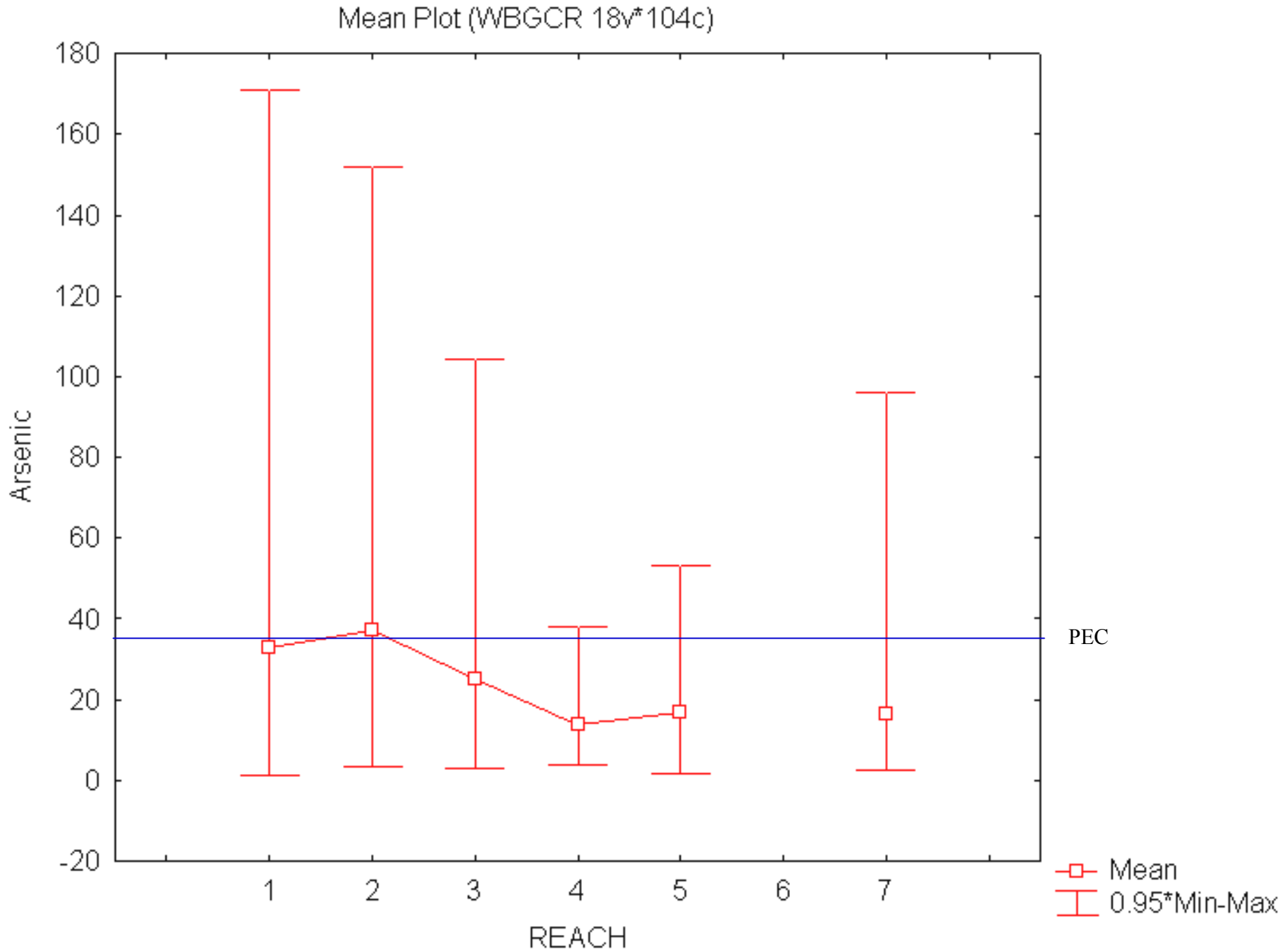

Jim Smith 10/30/02
Reach 4 - West End

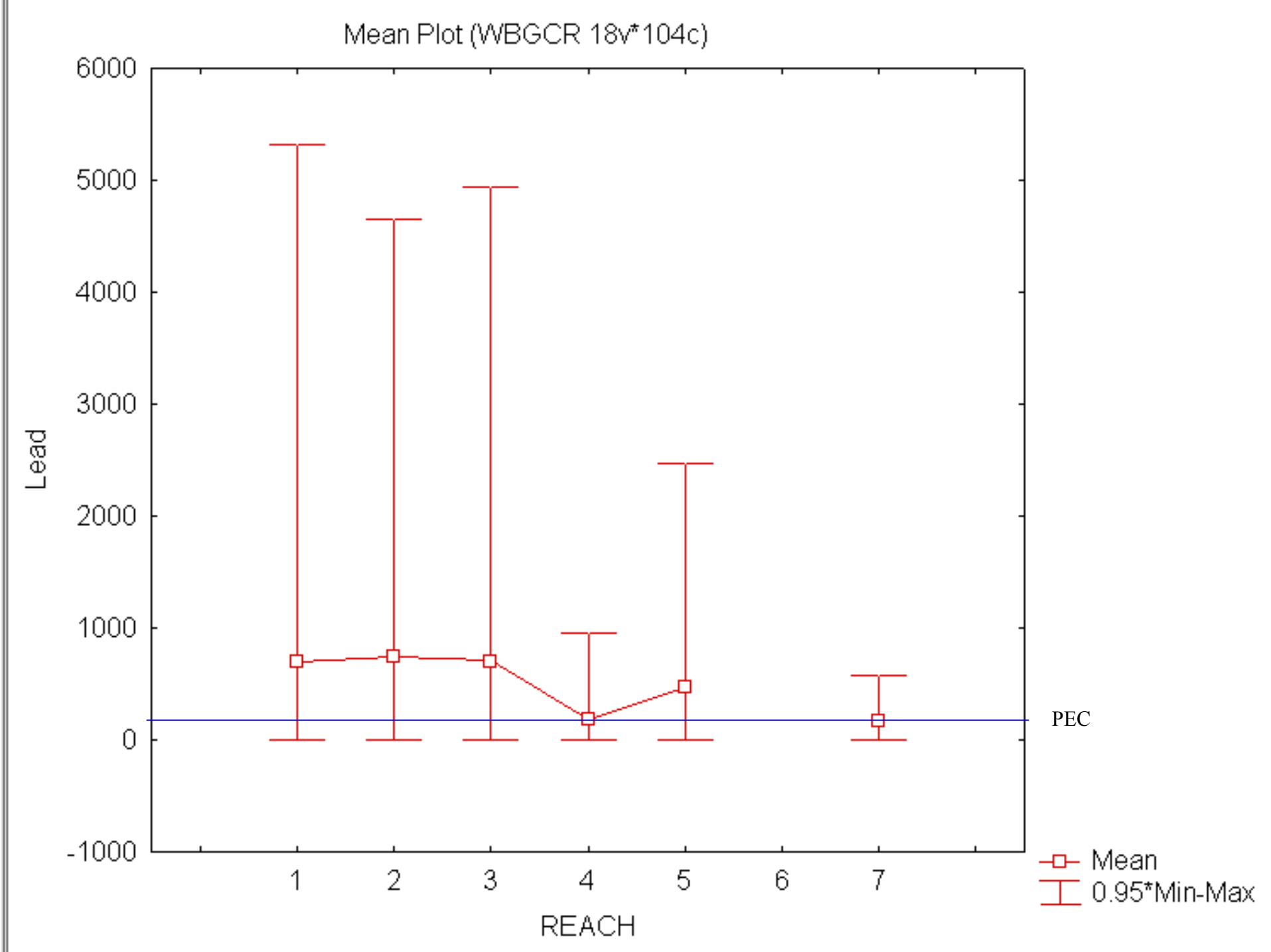

Jim Smith 10/30/02
Reach 3 - West End

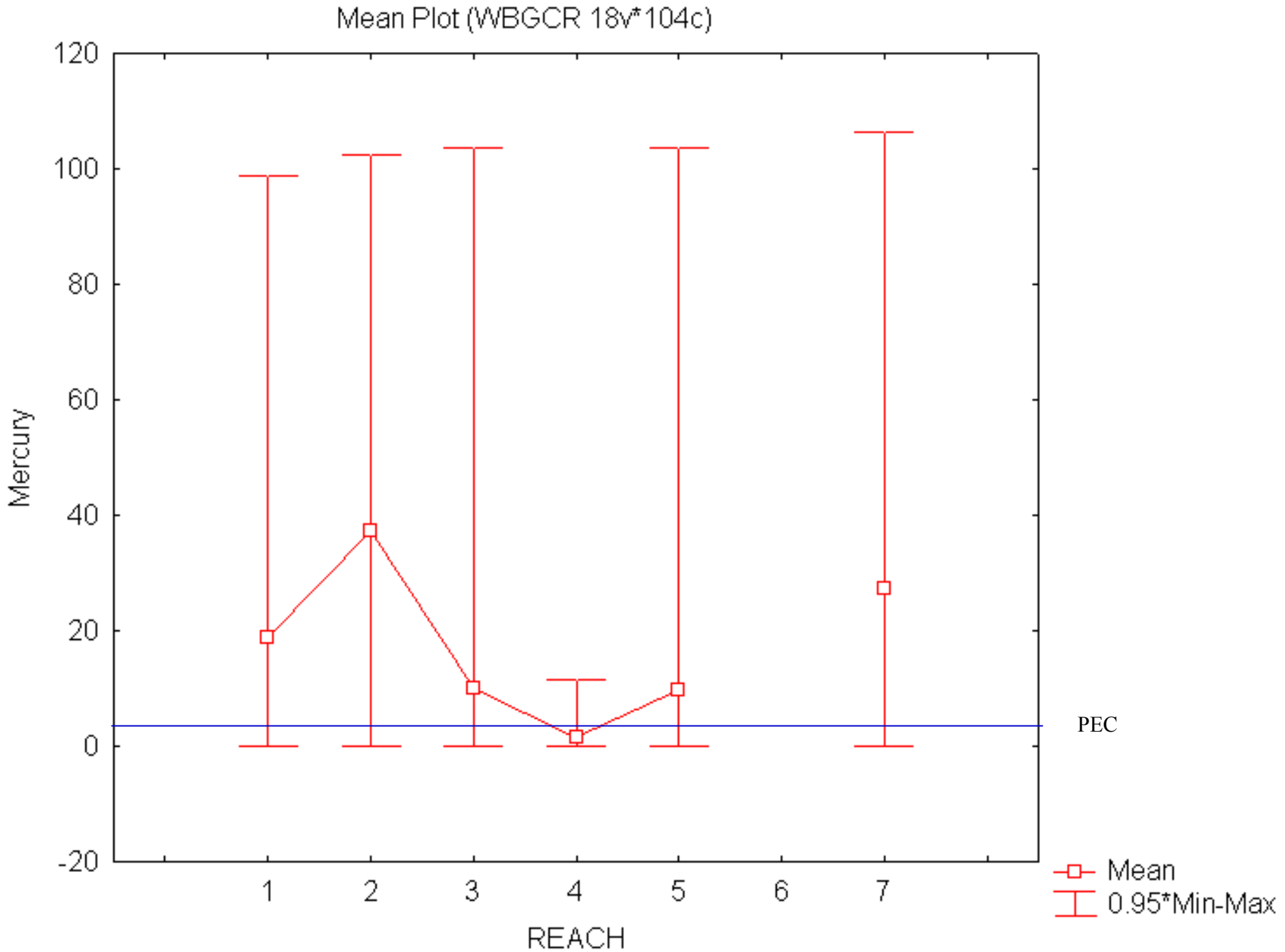
Variable	Descriptive Statistics (WBGCR)				
	Valid N	Mean	Minimum	Maximum	Std.Dev.
Total PCBs	104	287.1	79.0000	3900	576.4
Arsenic	104	24.7	1.2000	180	37.7
Barium	104	161.7	5.8000	840	167.6
Cadium	104	58.1	0.0910	123	50.7
Chromium	104	85.7	3.2000	1300	192.0
Copper	104	160.8	1.3000	950	222.3
Lead	104	515.4	2.4000	5600	1145.5
Mercury	104	18.8	0.0130	112	37.7
Selenium	104	31.2	0.5800	118	47.6
Silver	104	84.8	0.7100	143	54.4
Zinc	104	1154.7	15.0000	10000	2033.2
Total LPAHs	104	123188.5	101.0000	1700000	259926.6
Total HPAHs	104	89097.6	101.0000	1200000	182712.7
Total PAHs	104	209563.1	101.0000	2900000	423628.3

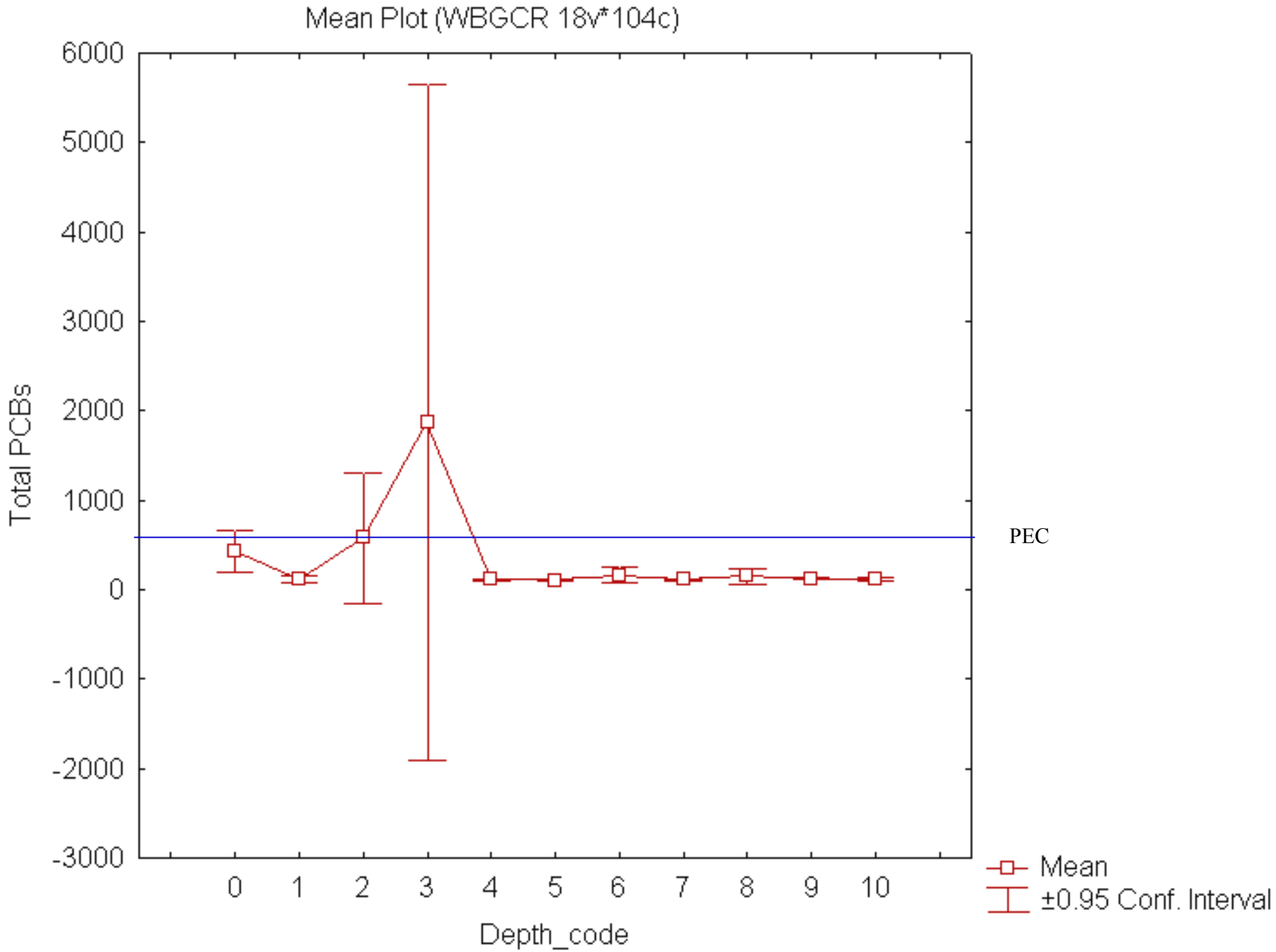

Mean Plot (WBGCR 17v*104c)
1600
1400
1200
1000
800
600
400
200
0
-200
Total PCBs
1
2
3
4
5
6
7
REACH
PEC
Mean
±0.95 Conf. Interval

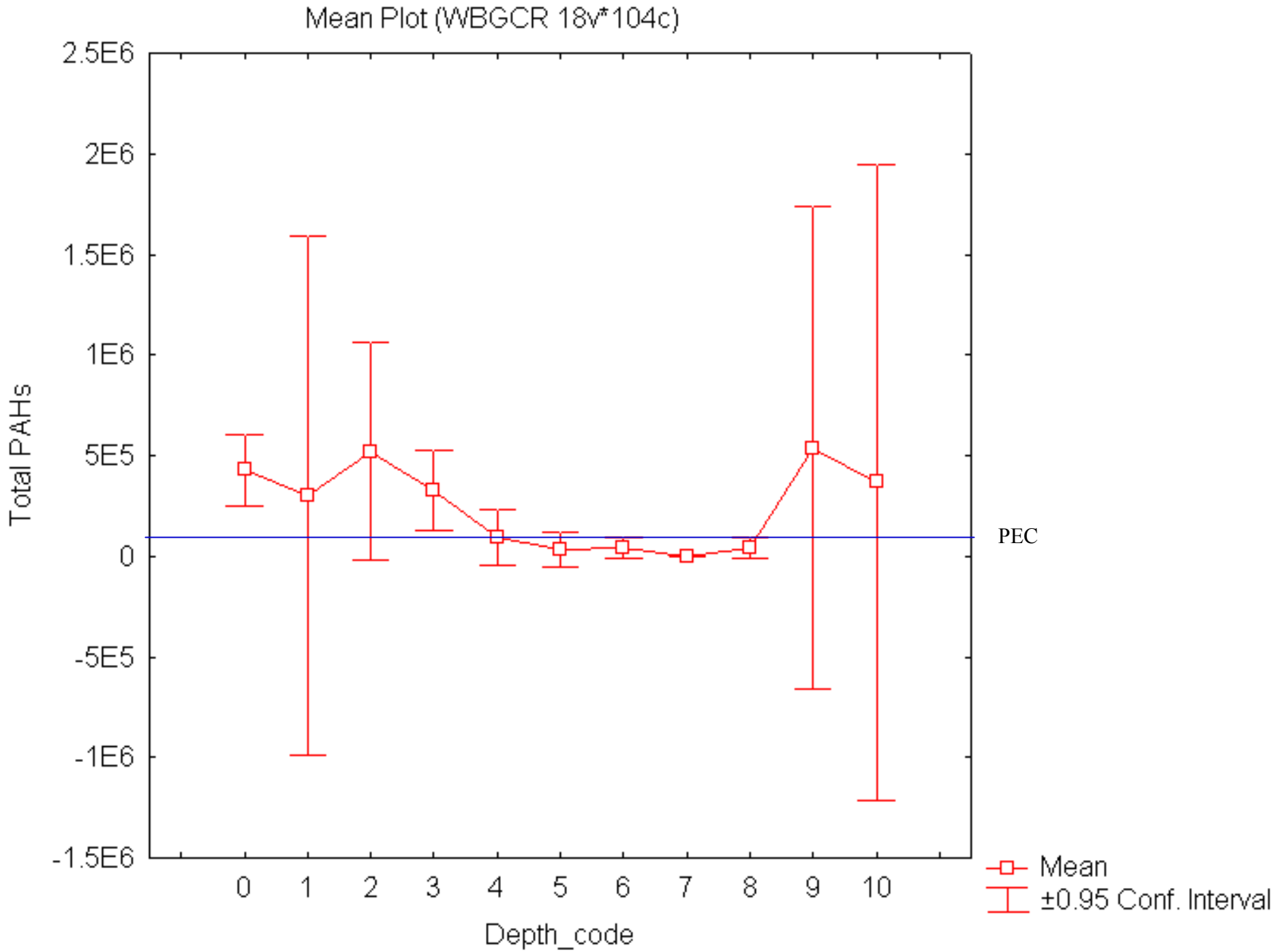

Mean Plot (WBGCR 17v*104c)
8E5
7E5
6E5
5E5
4E5
3E5
2E5
1E5
0
-1E5
Total PAHs
1
2
3
4
5
6
7
REACH
PEC
Mean
±0.95 Conf. Interval

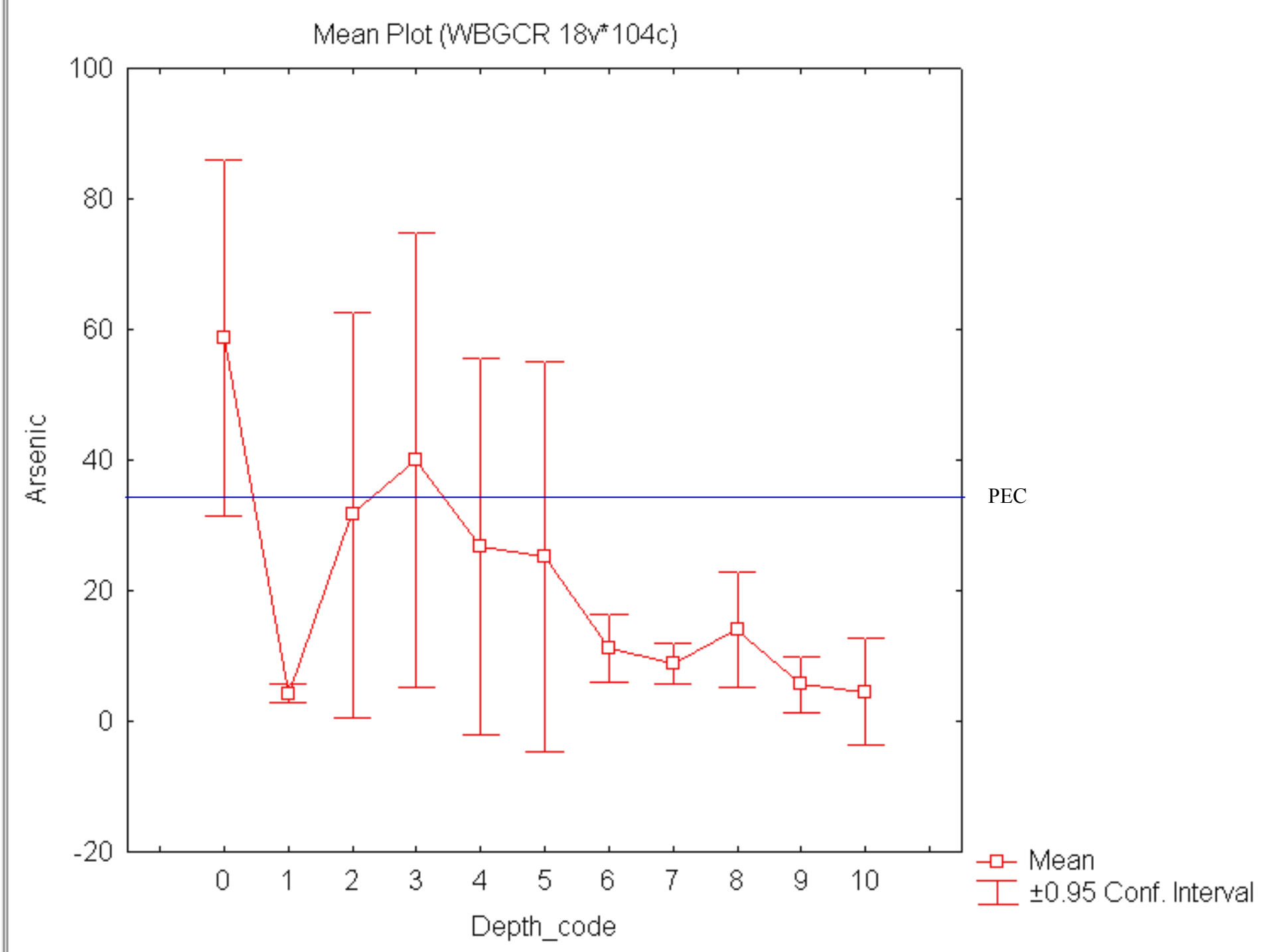

Mean Plot (WBGCR 18v*104c)
Arsenic
180
160
140
120
100
80
60
40
20
0
-20
1
2
3
4
5
6
7
REACH
PEC
Mean
0.95*Min-Max

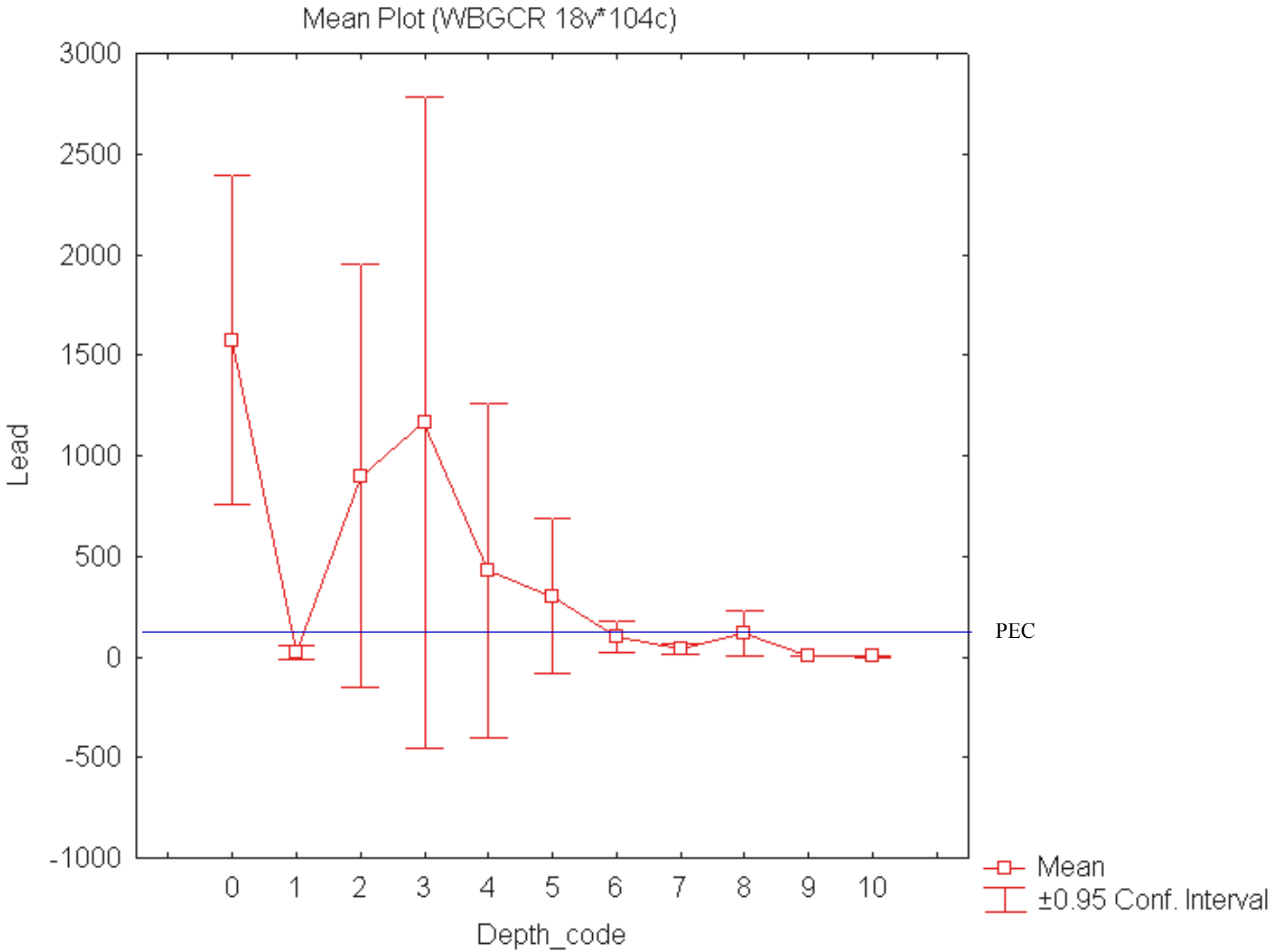

Mean Plot (WBGCR 18v*104c)
6000
5000
4000
3000
2000
1000
0
-1000
Lead
1
2
3
4
5
6
7
REACH
PEC
Mean
0.95*Min-Max

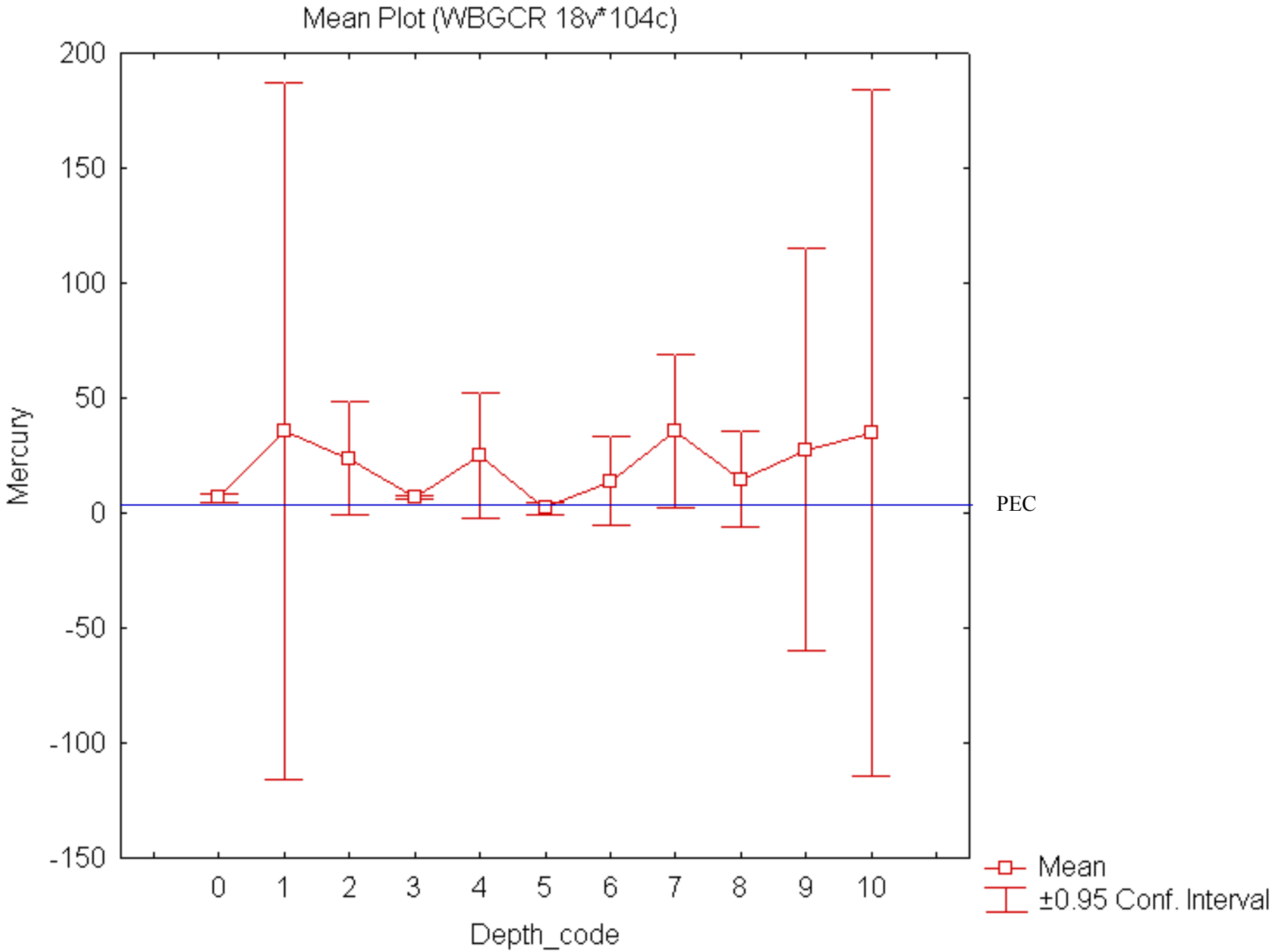

Mean Plot (WBGCR 18v*104c)
120
100
80
60
40
20
0
-20
Mercury
1
2
3
4
5
6
7
REACH
PEC
Mean
0.95*Min-Max


Mean Plot (WBGCR 18v*104c)
6000
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
Total PCBs
0
1
2
3
4
5
6
7
8
9
10
Depth_code
PEC
Mean
±0.95 Conf. Interval


Mean Plot (WBGCR 18v*104c)
2.5E6
2E6
1.5E6
1E6
5E5
0
-5E5
-1E6
-1.5E6
Total PAHs
0
1
2
3
4
5
6
7
8
9
10
Depth_code
PEC
Mean
±0.95 Conf. Interval


Mean Plot (WBGCR 18v*104c)
100
80
60
40
20
0
-20
Arsenic
0
1
2
3
4
5
6
7
8
9
10
Depth_code
PEC
Mean
±0.95 Conf. Interval


Mean Plot (WBGCR 18v*104c)
3000
2500
2000
1500
1000
500
0
-500
-1000
Lead
0
1
2
3
4
5
6
7
8
9
10
Depth_code
PEC
Mean
±0.95 Conf. Interval


Mean Plot (WBGCR 18v*104c)
200
150
100
50
0
-50
-100
-150
Mercury
PEC
0
1
2
3
4
5
6
7
8
9
10
Depth_code
Mean
±0.95 Conf. Interval

PRELIMINARY ANALYSIS OF SEDIMENT TOXICITY WBGCR

Sediment Sample ID	CERC_ID	Survival	Length	4-h Survival	24-h Survival	Total LPAHs	Total HPAHs	Total PAHs
NA	WB	98	4.15	100	95			
FW-WB-01-CS-7-9.3	8	89	3.89	100	98	U	U	U
FW-WB-02-CS-2.9-6	7	95	3.86	100	100	650	220	870
FW-WB-03-CS-9.5-11.2	5	92	3.73	100	100	U	U	U
FW-WB-05-CS-7.5-10	4	100	4.45	100	93	740	3700	4400
FW-WB-07-CS-2-4	2	100	3.93	100	98	U	U	U
FW-WB-07-CS-7.1-9.4	1	96	3.96	100	100	U	U	U
FW-WB-08-CS-0-2	3	90	4.11	98	98	510	370	880
FW-WB-10-CS-0-3.2	16	0	NM	NT	NT	510000	570000	1100000
FW-WB-10-CS-3.2-6	9	98	3.83	100	100	U	U	U
FW-WB-12-CS-6-8.5	15	95	4.05	100	100	U	U	U
FW-WB-13-CS-6.1-9.6	24	98	4.05	100	100	U	U	U
FW-WB-14-CS-0-2	14	3	NM	0	0	330000	380000	700000
FW-WB-16-CS-1.9-5.2	23	31	NM	0	0	55000	63000	120000
FW-WB-17-CS-0-3.8	20	51	4.43	0	0	22000	43000	64000
FW-WB-18-CS-6.5-9.3	22	98	4.09	100	100	U	U	U
FW-WB-19-CS-0-2	11	19	NM	0	0	7800	76000	84000
FW-WB-20-CS-5.5-8.8	12	94	4.13	100	95	3900	700	4600
FW-WB-21-CS-3.5-5.6	21	96	4.03	100	98	U	240	240
FW-WB-22-CS-3.6-6	26	98	4.17	100	100	U	U	U
FW-WB-25-CS-7.7-10.1	37	94	4.21	100	100	U	U	U
FW-WB-26-CS-6.5-7.9	33	91	4.37	95	92	270	420	690
FW-WB-27-CS-5.4-6.9	27	90	4.12	100	94	U	630	630
FW-WB-28-CS-0-7	29	21	NM	0	0	260000	270000	530000
FW-WB-29-CS-6.6-8.8	40	44	4.44	0	0	180000	93000	270000

PRELIMINARY ANALYSIS OF SEDIMENT TOXICITY WBGCR

Sediment Sample ID	CERC_ID	Survival	Length	4-h Survival	24-h Survival	Total LPAHs	Total HPAHs	Total PAHs
FW-WB-30-CS-3.1-4.9	41	99	4.06	100	95	U	U	U
FW-WB-31-CS-4-6.5	19	30	NM	75	68	270000	190000	460000
FW-WB-32-CS-0-2	18	95	4.21	47	8	5500	30000	35000
FW-WB-34-CS-1.7-4.6	36	94	4.05	95	63	2300	14000	16000
FW-WB-34-CS-6.4-8.7	30	100	4.3	100	86	U	U	U
FW-WB-35-CS-1.5-5	34	9	NM	0	0	350000	230000	570000
FW-WB-36-CS-0-2.2	42	88	4.47	0	0	95000	75000	170000
FW-WB-37-CS-7.8-9.1	32	86	3.68	98	87	250	U	250
FW-WB-39-CS-3.1-5.3	39	96	4.22	100	100	U	U	U
FW-WB-40-CS-0-3	31	59	4.69	0	0	91000	110000	200000
FW-WB-41-CS-6.1-8.1	38	100	4.33	100	100	U	U	U
FW-WB-42-CS-1.5-6	43	36	NM	0	0	570000	410000	980000
FW-WB-43-CS-0-2	13	0	NM	NT	NT	340000	320000	660000
FW-WB-43-CS-7.7-9.9	6	86	4.27	100	100	1200	5500	6700
FW-WB-46-CS-5.2-8	17	96	4.05	100	100	U	U	U
FW-WB-48-CS-1.8-4	10	91	3.9	92	86	U	U	U
FW-WB-49-CS-1.6-4.5	35	46	4.22	0	0	270000	310000	570000
FW-WB-51-CS-1.3-6	25	3	NM	100	0	1700000	1200000	2900000
FW-WB-51-CS-6-8.1	28	98	3.97	100	93	8400	28000	36000

Draft Fish Tissue Results

Reach	Fish	Tissue Type	Mercury	Total PCBs	Consumption Advisory Group
1	Goldfish	whole	<.048	0.820	
1	Goldfish	whole	<.048	1.100	
1	Goldfish	fillet	<.049	0.490	3-PCB
1	Carp	fillet	<.050	0.730	3-PCB
1	Chinook	fillet	0.140	1.100	4-PCB
1	Chinook	fillet	0.170	1.700	4-PCB; 2-M
1	Chinook	fillet	0.240	1.000	3-PCB; 2-M
1	Steelhead	fillet	0.370	1.000	3-PCB; 2-M
2	Goldfish	fillet	<.049	0.510	3-PCB
2	Chinook	fillet	0.230	0.770	3-PCB; 2-M
2	Chinook	fillet	<.050	1.000	3-PCB
4	Goldfish	whole	<.047	0.350	
6	Goldfish	whole	<.048	4.800	
6	Carp	fillet	<.048	3.200	5-PCB
6	Carp	fillet	<.050	0.730	3-PCB
7	Goldfish	fillet	<.050	3.700	5-PCB
7	Carp	fillet	<.049	1.100	4-PCB
7	Goldfish	whole	0.240	1.400	

ANALYSIS AND DESIGN REPORT

FOR THE

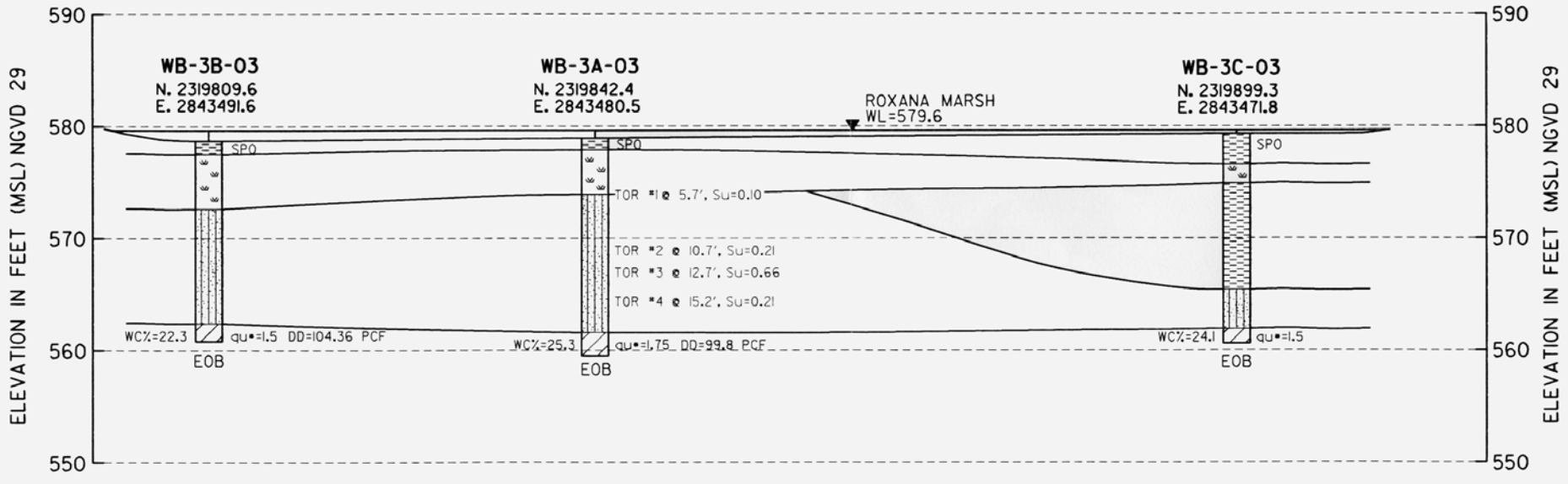
EAST CHICAGO HABITAT ENHANCEMENT DEMONSTRATION ROXANA MARSH GEOTECHNICAL INVESTIGATION

EAST CHICAGO, INDIANA

PREPARED FOR
THE U.S. ARMY CORPS OF ENGINEERS
CHICAGO DISTRICT

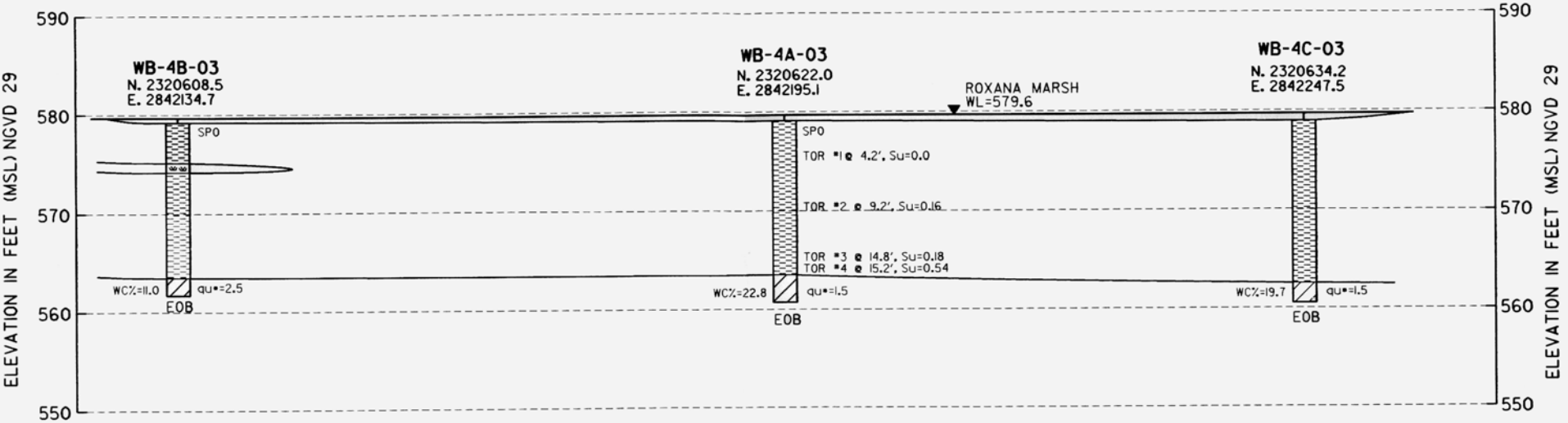
PATRICK ENGINEERING PROJECT NO. 9326.E0

MARCH 2003

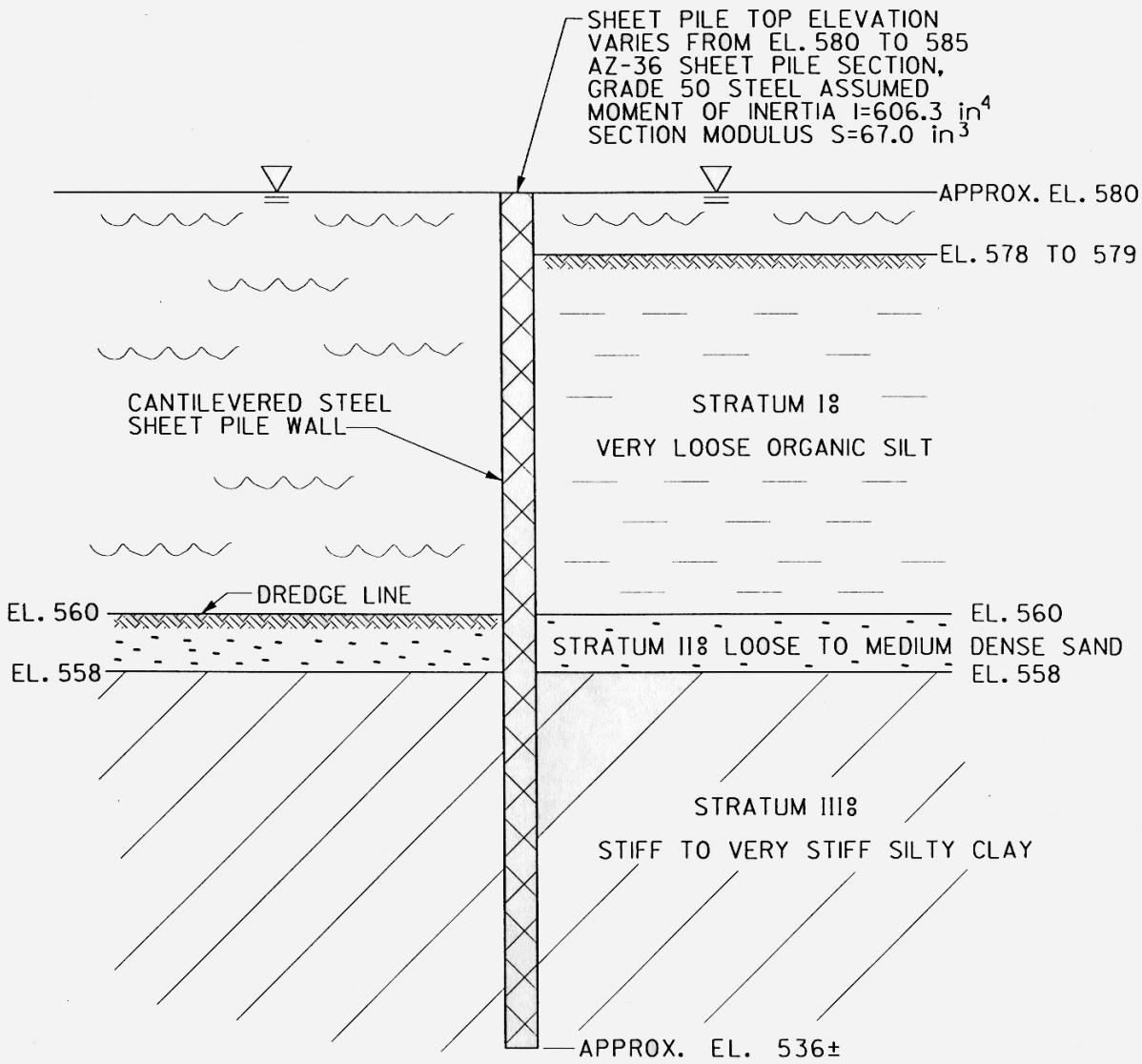


WEIR 3 SOIL PROFILE C-C'

WEIR 1 SOIL PROFILE A-A'



WEIR 4 SOIL PROFILE B-B'



WEIR SCHEMATIC AFTER DREDGING–ROXANA MARSH

NOT TO SCALE